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ABSTRACT

The influence of children's levels of field-dependence-independence on their performance with the passive transformation was investigated. Eighty 6th graders, classified as field-dependent or field-independent, were presented with sentence-question combinations, each in either the active or passive voice, and numbers of correct responses were recorded. Results showed that field-independent Ss performed better, overall, than did field-dependent Ss. In addition, the three-way interaction of field-deperdence-independence, sentence voice, and question voice was also significant. Field-dependent Ss performed significantly poorer on the active-passive and passive-active combinations than on the active-active and passive-passive combinations. There were no significant differences among the four treatments within the field-independent Ss. Thus, field-dependent Ss had greatest difficulty with combinations requiring them to isolate the essential elements of a sentence and use them in a different form; field-independent Ss did not experience this difficulty. (Author/MS)

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Field Dependence-Independence and Performance with the Passive Transformation

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The construct, field dependence-independence (FD-I), has been described as a general ability, to a greater or lesser extent, to "keep things separate in experience" or to "deal with part of an organized field independent of the field" (Witkin et al., 1971). Originally viewed as a perceptual phenomenon, FD-I has also been found to manifest itself, in congruent form, in other nonperceptual psychological areas (i.e., intellectual activities and personality functioning). Since scores on any measure of FD-I form a continuous distribution, the labels "field dependent" (FD) and "field independent" (FI) are relative terms.

Characteristically, in a FD (global) mode of functioning, the detection of elements in a field is dominated by the overall organization of the field, and the elements are consequently perceived as fused. In an FI (articulated) mode of perceiving, elements of the field are experienced as discrete from organized ground. Research has shown, however, that FD-I is not simply the ability to discriminate parts of a field from each other or to discriminate between conflicting elements, but rather the ability to break up an organized field in order to separate out a part of it (Karp, 1963). Furthermore, a number of investigations have demonstrated a relationship between FD-I and problem solving tasks that require the isolation of an element from an "organized" background and the utilization of that element in a different situation (Fenchel, 1958; Karp, 1963). It would appear, therefore, that FI persons are more successful at activities requiring analytic ability than are their FD counterparts.

The differences between FD and FI functioning can also be seen in the tendency to impose a structure, not to impose a structure, or to restructure a given stimulus array. Relatively FI persons are able not only to break up an organized visual field in order to locate a

designated component, but also to impose an organization on stimuli which lack inherent structure (Witkin et al., 1962). On the other hand, FD persons are neither able to break up a visual field nor are they capable of imposing a structure on an ambiguous situation. In other words, they leave ambiguous material "as is" and follow the organization of the field as presented.

The apparent pervasiveness of the construct and the differential analytic and structuring abilities of FD and FI persons strongly suggest a possible differential linguistic competence, specifically in the area of grammatical structure and especially in the area of the transformation of that structure. However, there is a paucity of significant findings relating FD-I to any aspect of verbal ability. The only relevant finding comes from the Doob (1958) investigation of prose style as a function of, among other things, FD-I. Doob reports a significant tendency of FD persons to write in the passive voice.

It is the purpose of the present study to investigate the relationship between FD-I and grammatical transformation, specifically the active-passive transformation. The active-passive transformation was chosen because of the ease with which it can be assessed, the prevalence of the structure in the English language, and because the transformation seems to reflect the abilities characteristic of the FI person. For example, the transformation from the active to passive voice requires the isolation of two components (i.e., the subject and the direct object) from the field (i.e., the active sentence) which is organized (i.e., in terms of its meaning) and the transposition (i.e., restructuring with a passive verb) of these elements to form a new sentence (i.e., the passive sentence). The process is reversed when the transformation is from the passive to the active voice. In other

words, to correctly transform a sentence from the active to the passive voice or vice versa, the subject and the direct object must be isolated, the voice of the verb must be switched to the opposite mode, and the subject and direct object reversed in position.

This process strongly parallels the strategy required to perform successfully on the Group Embedded Figures Test (GEFT) which is the group version of the Embedded Figures Test (EFT), a popular measure of FD-I. On the GEFT, the subject is required to isolate a component (i.e., a sample geometric figure) from a field (i.e., a complex geometric pattern) which strongly embeds the component and which is organized in terms of the systematic relationship between the sample figure and the complex design.

In both the active-passive transformation and performance on the GEFT, the specific ability at issue appears to be a type of disembedding of a critical element or elements (i.e., words in a sentence or simple figures in the GEFT) from a field (i.e., a sentence or a complex geometric design) that strongly embeds the critical element (i.e., either through the meaning of the sentence or through systematic geometric relationship on the GEFT).

For the purposes of the present investigation, it is anticipated that FD-I will be related to the ability to perform the active-passive transformation. Specifically, it is hypothesized that relatively FI persons, because of their superior analytic and structuring abilities, will be more successful in performing the transformation than their FD counterparts. In addition, there should be no difference between FD and FI Ss when no transformation is required.

Procedure and Design

A random sample of 150 sixth-grade children from a suburban central school was selected and the GEFT administered. The GEFT was chosen as the measure of FD-I in this study, not only because it appeared to parallel most closely the process required in the active-passive transformation, but also because of the necessity of screening a large number of subjects to insure the largest possible difference between FD and FI subjects. A subject's "score" was defined as the number of correct tracings of the appropriate simple figure on each complex design on parts II and III of the GEFT. Children whose obtained scores were zero or one were excluded from the sample on the basis that these observations might have been spurious due to failure to understand directions or some other factor extraneous to the study. From the remainder of the sample, the 40 Ss having the highest scores were classified as relatively FI, and the 40 Ss having the lowest scores were classified as relatively FD. Scores in the FD group ranged from 2 to 9, and in the FI group from 10 to 18.

Each of these groups was then randomly subdivided into four treatment groups of 10 each. Each child in each of the resulting eight groups was then presented with 18 statements followed by questions in either the active or passive voice. All the statements for a particular child were in the same voice. All questions for each child were also in the same voice, though not necessarily in the same voice as the statements. Thus the following four treatment combinations were obtained:

1. Active sentence - active question (AA)
2. Active sentence - passive question (AP)
3. Passive sentence - active question (PA)
4. Passive sentence - passive question (PP)

The statements and questions were constructed from material familiar to the children and presented in a straightforward fashion so that the most plausible reason for answering a question incorrectly would be an error in making a necessary transformation. The following is an example of an item from the active-passive treatment combination.

Patty helps Susan. Which one is helped by the other?

a. Patty

b. Susan

The subjects responded by simply circling the letter of the correct answer. The location of the correct answer was randomized among items to prevent the subjects from establishing that one location was always correct and then simply responding by location.

The resulting design is a 2 x 2 x 2 (FD-I by sentence voice by question voice) analysis of variance where the dimension of FD-I is a blocking factor.

Results and Discussion

The results of the overall analysis of variance are presented in Table 1. As can be seen from the table, significant effects were the

Insert Table 1 about here

main effect of FD-I, the two-way interaction of sentence voice by question voice, and the three-way interaction of FD-I by sentence voice by question voice.

Field Dependence-Independence:

FI subjects performed significantly better overall (Mean = 17.00) than did FD subjects (Mean = 16.03). This result may be attributable to the FI Ss' superior "analytic intelligence." The results of several factor analytic studies seem to indicate that both the Wechsler Adult

Intelligence Scale (WAIS) and the Wechsler Intelligence Scale for Children (WISC) load on three different factors, one of which is an analytic factor (Cohen, 1957; 1959). Additional factor analytic studies show that the EFT also loads on this analytic factor, but not the other two (Goodenough and Karp, 1961; Karp, 1963). There is, therefore, a moderate correlation between IQ and EFT performance.

Sentence Voice by Question Voice:

The significantly different means in this interaction are shown in Table 2, and a sketch of the interaction is given in Figure 1.

Insert Table 2 followed by Figure 1 about here

The AP and PA combinations are not significantly different from each other, nor are the AA and PP combinations. However, both the AP and PA combinations are significantly more difficult than either the AA or the PP combinations. This is consistent with the generally accepted notion that the AP and PA combinations are more difficult to master than are the AA and PP combinations. Wright (1969), for example, obtained precisely these same results. Interestingly, Powers and Gowie (1976) found no differences among the four combinations using first-year graduate students as subjects. Apparently this rather restricted population has mastered the passive transformation.

Field Dependence-Independence by Sentence Voice by Question Voice:

This interaction contains the information most important to the thesis of this paper. The significantly different means in the interaction are presented in Table 3, and a sketch of the interaction is shown in Figure 2.

Insert Table 3 followed by Figure 2 about here

It can be seen from the table and the figure that FD subjects performed significantly better with the AA and PP combinations than with either the AP or PA combinations, whereas the means for FI subjects are homogeneous.

This is precisely the result predicted on the basis of characteristics of FD and FI subjects. The FD subjects had considerably more difficulty when they lead to disembeded words from a statement and reorder them to answer a question about the statement. For the most part FI subjects, being more adept at disembedding and reordering, did not experience this difficulty.

Conclusion

It is possible that FD-I is related to language development in a more general way. Although only one grammatical structure was investigated in the present paper, there are a great many such structures that may require a rather similar disembedding procedure to facilitate comprehension. Similar results might conceivably be found with comprehension of reading passages where entire statements or ideas must be disembeded and reordered to achieve understanding.

It appears that considerable research might be done in this area.

REFERENCES

Cohen, J. The factorial structure of the WAIS between early adulthood and old age. Journal of Consulting Psychology, 1957, 21, 283-290.

Cohen, J. The factorial structure of the WISC at ages 7-6, 10-6, and 13-6. Journal of Consulting Psychology, 1959, 23, 285-299.

Doob, L. W. Behavior and grammatical style. Journal of Abnormal and Social Psychology, 1958, 56, 398-400.

Fenchel, G. H. Cognitive rigidity as a behavioral variable manifested in intellectual and perceptual tasks by an outpatient population. Unpublished doctoral dissertation, New York University, 1958.

Goodenough, D. H. and Karp, S. A. Field dependence and intellectual functioning. Journal of Abnormal and Social Psychology, 1961, 63, 241-246.

Karp, S. A. Field dependence and overcoming embeddedness. Journal of Consulting Psychology, 1963, 27, 294-302.

Powers, J. E. and Gowie, C. J. Repeated measures designs in psycholinguistic research. Paper presented at the 1976 meeting of the New England Educational Research Organization, Provincetown, Mass.

Witkin, H. A., Dyk, R., Faterson, H. F., Goodenough, D. R., and Karp, S. A. Psychological differentiation. New York: Wiley, 1962.

Witkin, H. A., Oltman, P. K., Raskin, E., and Karp, S. A. A manual for the embedded figures test. Palo Alto, California: Consulting Psychologists Press, Inc., 1971.

Wright, P. Transformations and the understanding of sentences. Language and Speech, 1969, 12, 156-166.

Table 1

Analysis of Variance
Field Dependence-Independence by Sentence Voice
by Question Voice

Source	Degrees of Freedom	Mean Squares	F
Field Dependence-Independence (F)	1	19.02	6.89*
Sentence Voice (S)	1	1.02	<1
Question Voice (Q)	1	.62	<1
F X S	1	2.80	1.01
F X Q	1	4.50	1.63
S X Q	1	70.30	25.47**
F X S X Q	1	19.03	6.89*
Error	72	2.76	
Total	79		

*$p < .025$
**$p < .001$

Table 2

Significantly Different Means in the Sentence Voice by Question Voice Interaction[1]

Sentence Voice	Question Voice	Mean	
Passive	Active	15.55	]
Active	Passive	15.60	]]
Passive	Passive	17.25	]
Active	Active	17.65	]

[1] The first mean in each bracket is significantly different ($p < .05$) from all means outside of that bracket, but not from other means contained in that bracket, using Tukey's procedure.

Table 3

Significantly Different Means in the Field Dependence-Independence by Sentence Voice by Question Voice Interaction[1]

Field Dependence-Independence	Sentence Voice	Question Voice	Mean
Dependent	Active	Passive	14.2
Dependent	Passive	Active	15.0
Independent	Passive	Active	16.1
Independent	Active	Passive	17.0
Dependent	Passive	Passive	17.2
Independent	Passive	Passive	17.3
Independent	Active	Active	17.6
Dependent	Active	Active	17.7

[1] The first mean in each bracket is significantly different ($p < .05$) from all means outside of that bracket, but not from other means contained in that bracket. using Tukey's procedure.

Figure 1

Sentence Voice by Question Voice Interaction

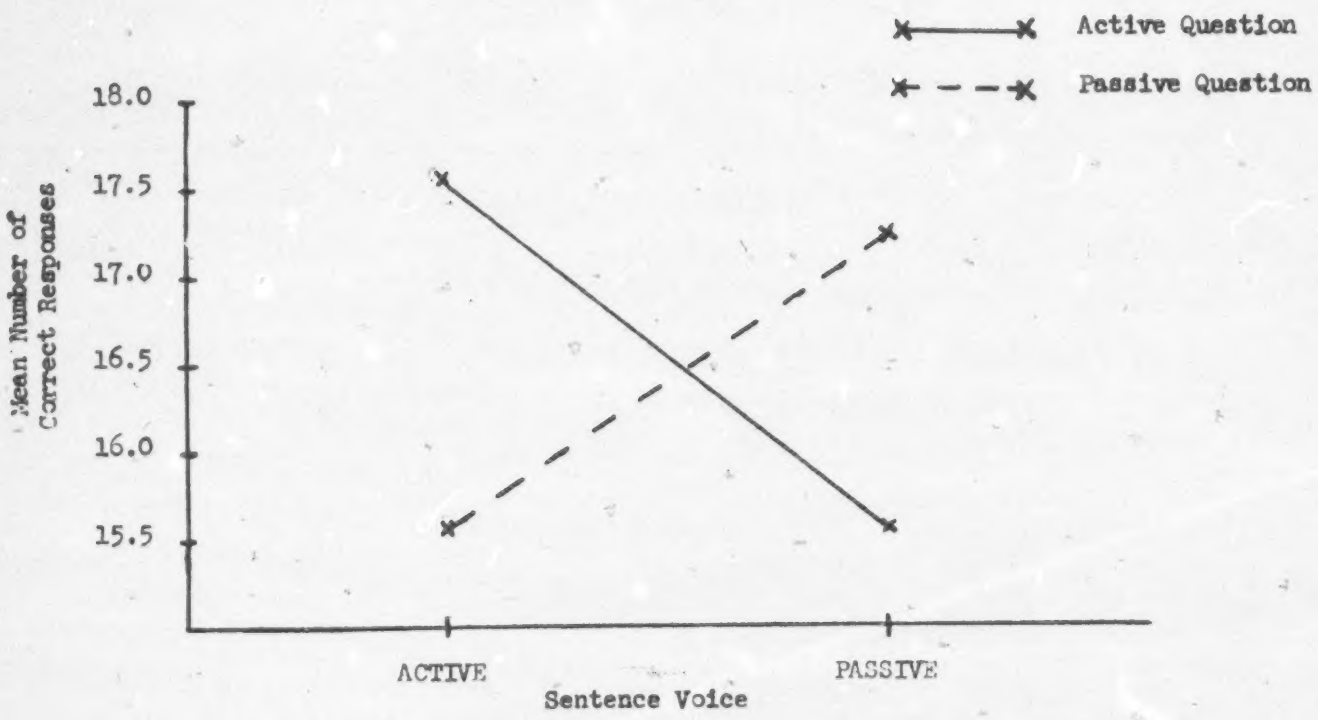

Figure 2

Interaction of Field Dependence-Independence, Sentence Voice and Question Voice